# Savannah River Site (SRS) Citizens Advisory Board "Board's-Eye View" of Cleanup

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SRS-Citizens Advisory Board
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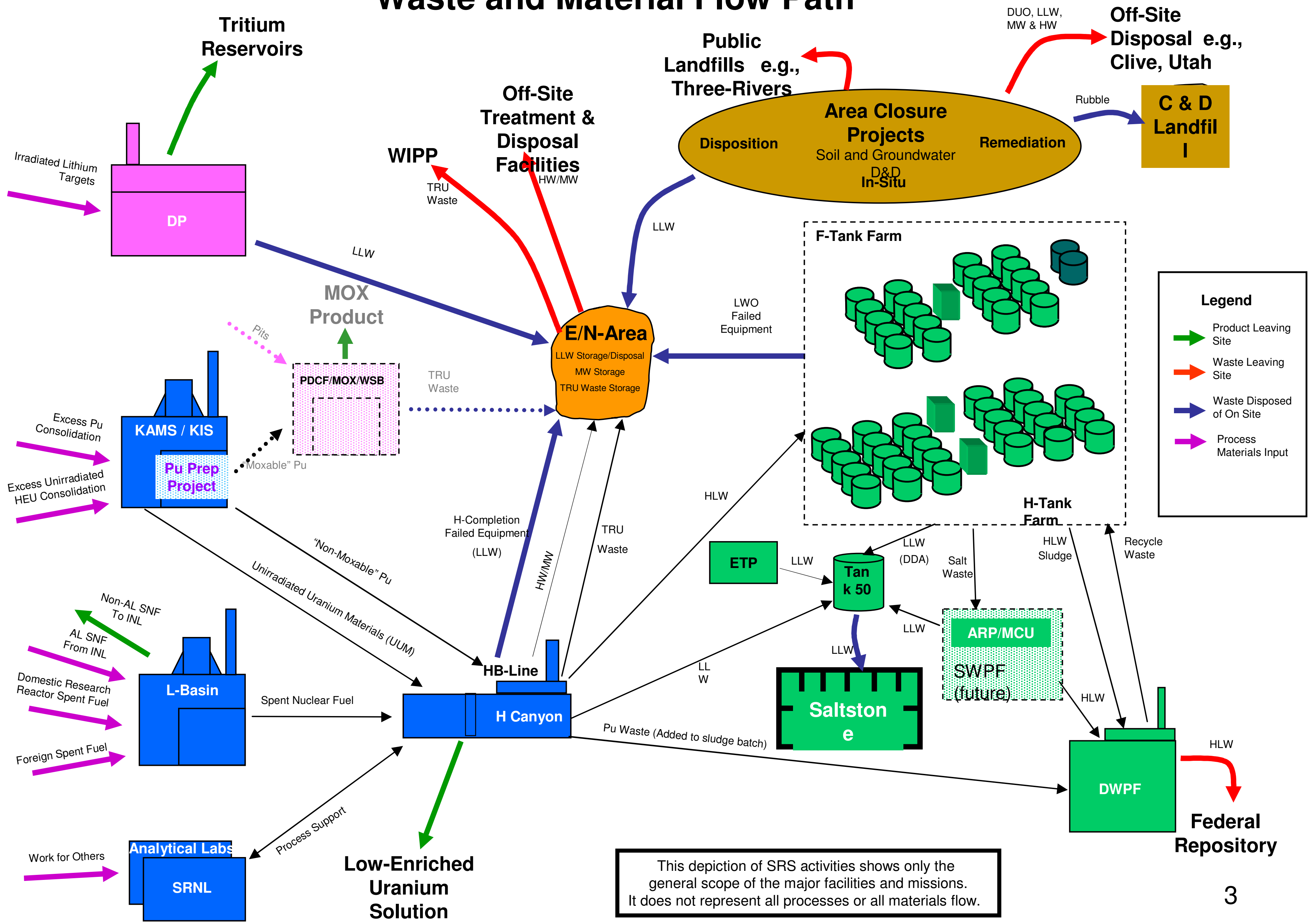
# Board's-Eye View

- Savannah River Site (SRS) Waste & Material Flow Path
  - National Nuclear Security Administration (NNSA) and Environmental Management Activities
- Environmental Cleanup
  - 2035 Completion Projects
    - Soil & Groundwater Remediation
    - Area Completion Strategy
    - H-Canyon's Role in SRS and Complex Cleanup
  - SRS Liquid Waste Disposition

# Savannah River Site
# Waste and Material Flow Path



# Savannah River Site
# "Waste and Material Flow Path"

<u>NNSA Activities</u>:

- Tritium Production
- Mixed Oxide (MOX) Fuel Production
- Plutonium/Weapons Nuclear Material Consolidation and Control in K-Area

Budget: $700-$800 Million/FY

# Savannah River Site
# “Waste and Material Flow Path”

Environmental Management (EM) Activities:

- Environmental Clean-up
- Excess Nuclear Material Stabilization and Disposition
- Spent Fuel Management in L-Area
- Safeguards and Security
- Federal Program Direction

*Budget: $1.3 Billion/FY*

Savannah River National Lab:

*Budget: $90 Million/FY*

# Environmental Cleanup

## “2035 Completion” Projects

### Nuclear Material Stabilization & Disposition

- Excess Plutonium; Highly Enriched Uranium; Unirradiated Uranium; Depleted Uranium Oxide; Transuranic Materials

### Spent Nuclear Fuel Stabilization & Disposition

### Solid Waste Stabilization & Disposition

### Soil and Groundwater Remediation

- Solvents from production; tritium in groundwater and in reactor disassembly basins

# Environmental Cleanup *(continued)*

"2035 Completion" Projects *(continued)*

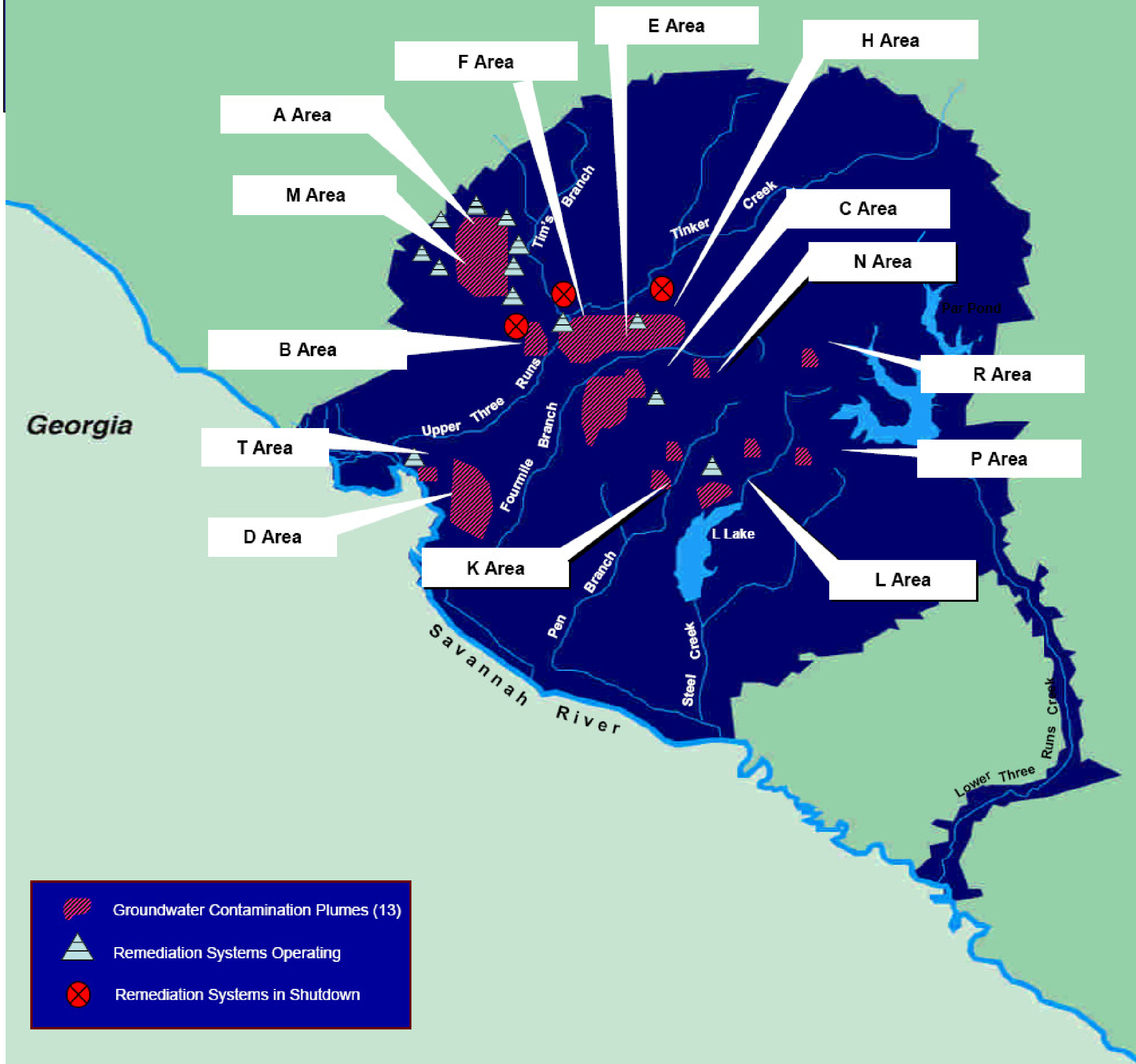
- Tank Farm Activities (Tanks closed by FY2032)
  - Salt Waste Processing Facility (SWPF) – Interim Processing; SWPF Under Construction
  - Defense Waste Processing Facility - Operational
- Safeguards & Security
- Program Direction; Community & Regulatory

# Environmental Cleanup *(continued)*

## Soil and Groundwater Remediation

- 14 Groundwater Plumes
- Area Completion Strategy (2005-2034)
- Nuclear Facility Deactivation & Decommissioning
- Met all Federal Facility Agreement – Appendix E Milestones

# Groundwater Plumes




**<u>14 Groundwater Contamination Plumes</u>**
A/M, B, C, D, E, F, G, H, K, L, N, P, R, T Areas

**<u>12 Active Remediation Systems</u>**
2 Airstrippers, 2 Recirculation, Dynamic Underground Stripping, 4 Soil Vapor Extraction Units (A/M Areas)
Base Injection (F&H Waste Management Facility)
Electrical Resistance Heating (Chemical, Metals, & Pesticides Pits)
Phytoremediation (Mixed Waste Management Facility)

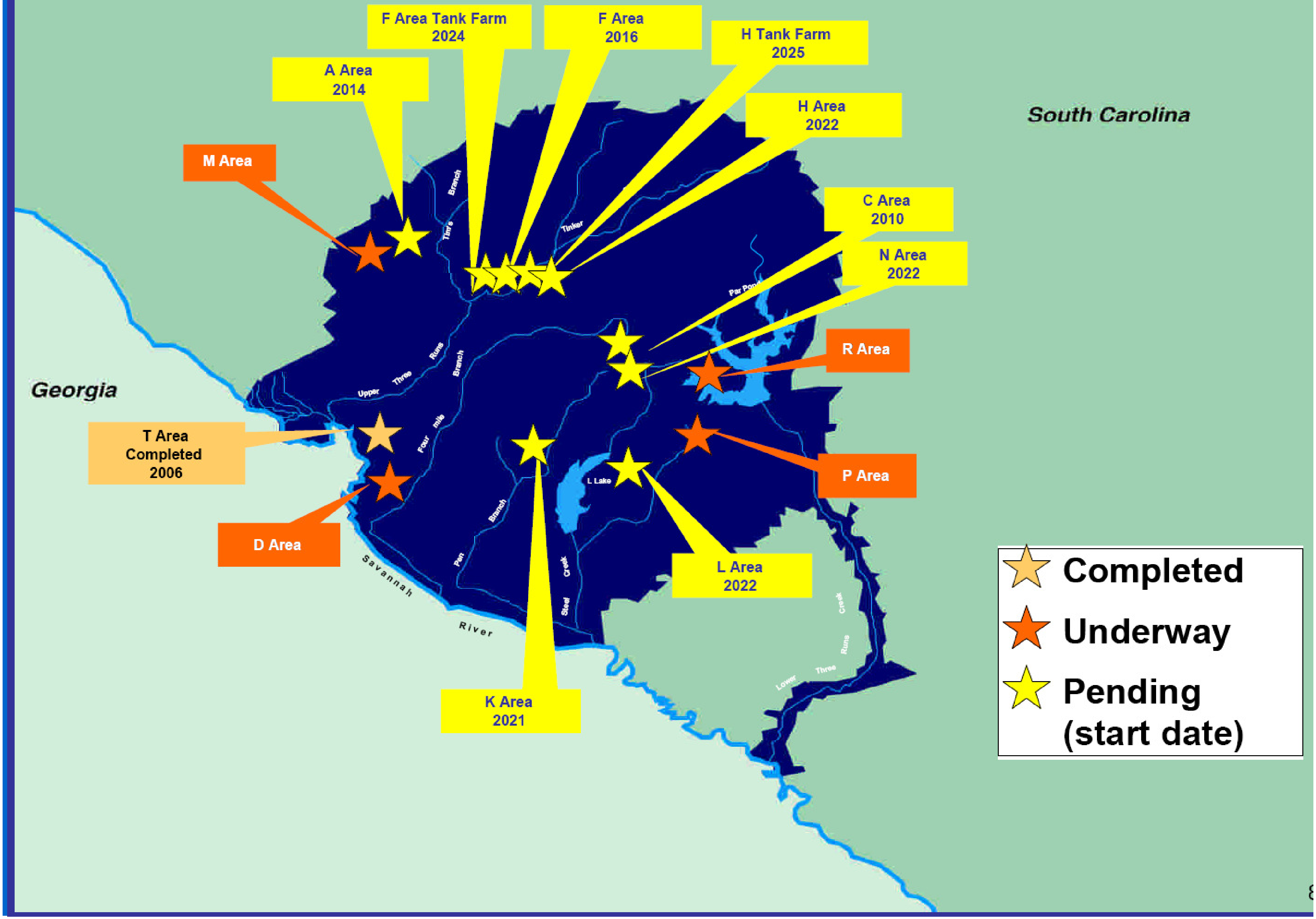
**<u>8 Enhanced Systems</u>**
Baroballs (A/M, Miscellaneous Chemical Basin, P Burning Rubble Pit)
Microblowers (A and C Burning Rubble Pits)
Barrier walls (F&H Waste Management Facility)
T Area Edible Oil Treatment

**<u>6 Passive Systems</u>**
Monitored Natural Attenuation (Chemical, Metals, & Pesticides Pits; D Oil Seepage Basin; R Reactor Seepage Basin; K and L Burning Rubble Pits, Sanitary Landfill)

**<u>3 Systems In Shutdown</u>**
Biosparge (Sanitary Landfill)
Groundwater Waste Treatment Units (F&H)

**<u>11 Systems Pending</u>**

# Area Completions



# Area Completion Strategy

- Groupings of Waste Units and Facilities by Geographic Area
  - Area “End-States” Determined (NEPA; Public Participation)
  - Soil and Groundwater Projects Integrated/Coordinated
    - Sampling, analysis, remediation Coordinated
  - Deactivation and Decommissioning
- Decreases “Footprint” of Impacted Areas
- “Slide Along” Activities/Lessons Learned/Technology Development
  - Electric resistance heating of subsurface
  - Phytoremediation
  - Subsurface “barrier” walls
  - Edible oil injection
  - Steam Injection
- Generation of Performance Assessment Data
  - F Tank Farm Performance Assessment

# Area Completion Strategy

| | |
|---|---|
| F-Area “Outside Facilities” | 2004-2008 |
| M-Area | 2004-2011 (scheduled) |
| P-Area Reactor | 2005-2014 (scheduled) |
| R-Area Reactor | 2007-2015 (scheduled) |

# H-Canyon – “A National Treasure”

- Only large scale processing Facility for Nuclear Materials;
- Scheduled Shutdown in 2019;
- Infrastructure Upgrades to Assure Completion of Mission;
- Proven, Reliable Technology.

# H-Canyon – A National Treasure
*(continued)*

Importance to DOE-Complex

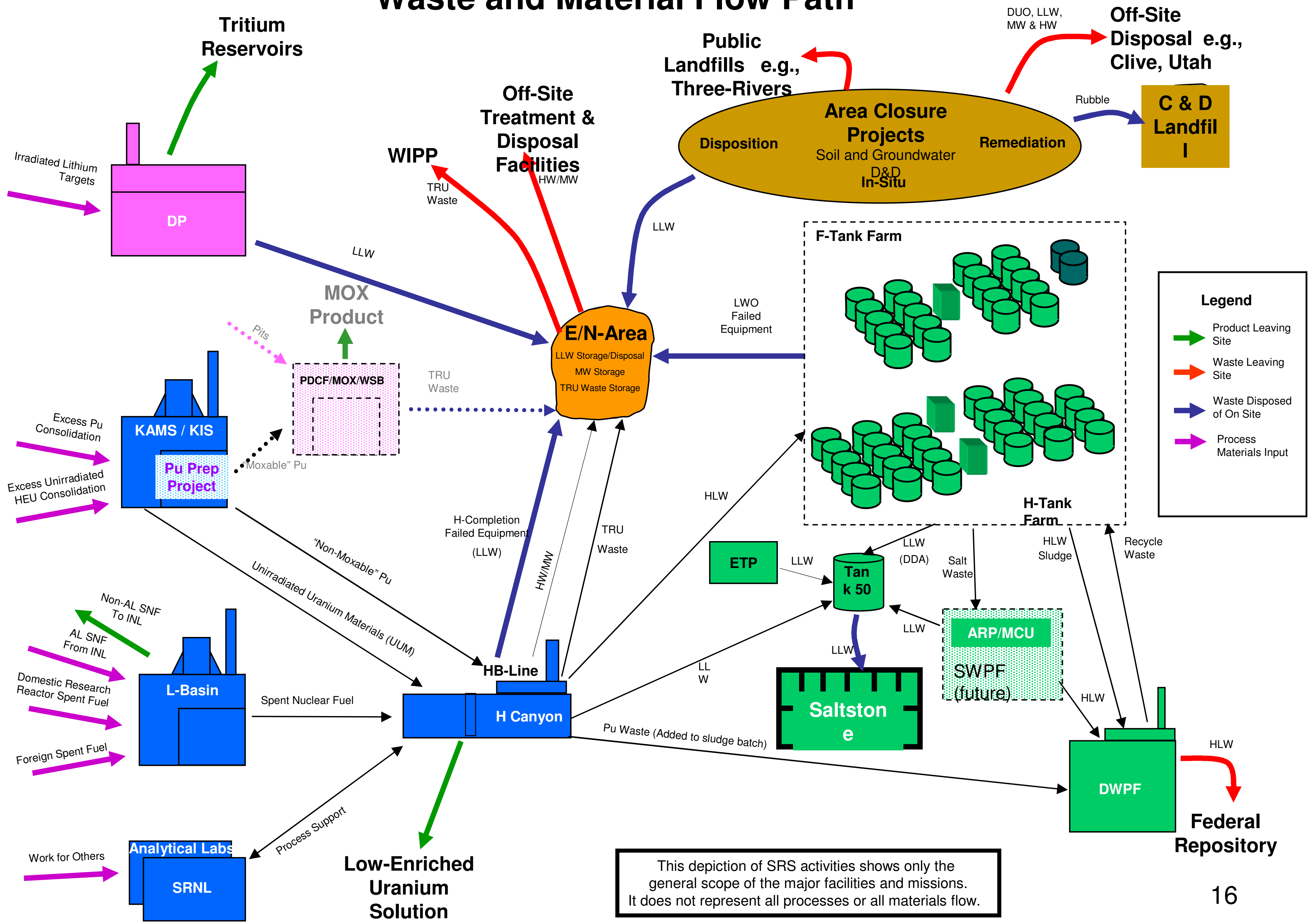
- “Down blending” of Highly Enriched Uranium to Low Enriched Uranium plowshares
- “Non-MOXable” Plutonium Disposition
- Other Nuclear Materials (e.g. Space Programs)
- Aluminum Spent Fuel Reprocessing
- Domestic Research Reactor Fuel Reprocessing
- Foreign Spent Nuclear Fuel/Non-proliferation
- Processing will keep other DOE Sites from implementing expensive security measures for small quantities of materials.

# H-Canyon – A National Treasure *(continued)*

## H-Canyon's Critical Role in SRS and Complex Waste Disposition Paths

- Plutonium to Defense Waste Processing Facility (DWPF)
- High Level Waste to Tank Farms, then to Saltstone or DWPF
- Low-Level Waste to Saltstone

# Savannah River Site
# Waste and Material Flow Path



# Liquid Waste Disposition

Legacy "Liquid Wastes" in F and H Tank Farms

- 37 Million Gallons of Liquid Wastes
  - Includes Radioactive Contaminants from other Sites
- 397,000,000 Curies
  - Half of the Radioactivity in the DOE Complex
- 51 Tanks (2 Closed; 12 Leaking; 22 "Non-compliant"; Carbon Steel)
- "Poses the single greatest environmental risk in the state of South Carolina"

# Liquid Waste Disposition
*(continued)*

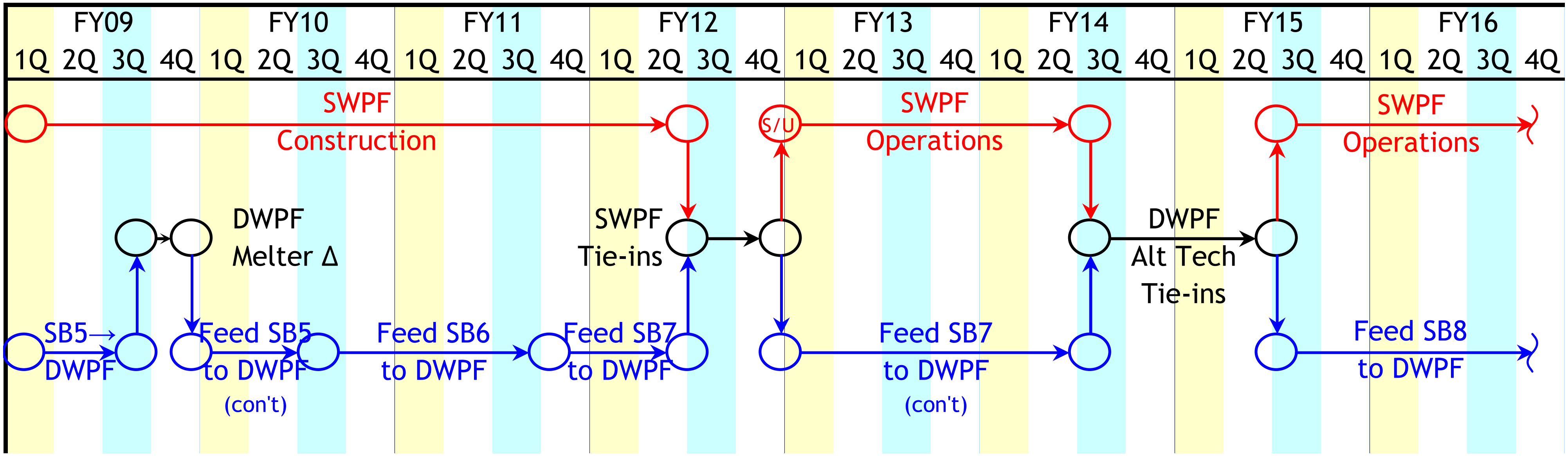
2005 Federal Legislation Allows Tank Closure with Grout, Residual Liquid Waste left in Tanks

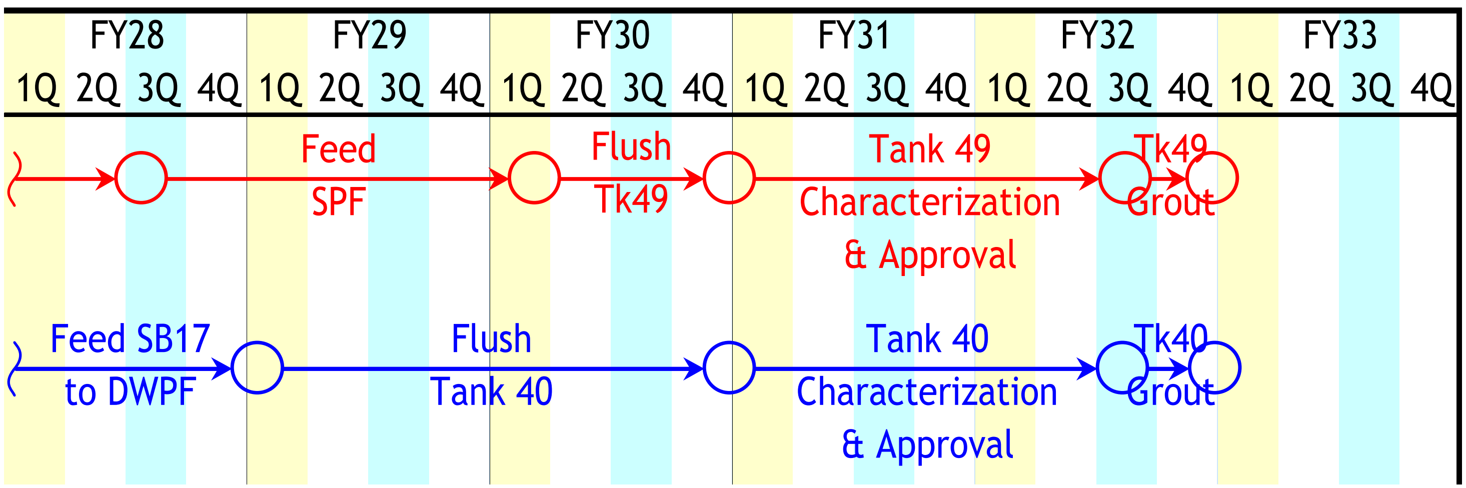
- DOE Secretary "Waste Determination"
  - Nuclear Regulatory Commission (NRC) Standards for Near-Surface Disposal
- NRC "Consultation" in development of Waste Determination
- NRC Monitoring of Tank Closure

Objectives

- Less than 1,400,000 Curies Disposed at the Savannah River Site (Saltstone)
- >99% of Radionudides Processed into Glass and Incapable of Future Use
- 8,000-9,000 "Cans" with Vitrified High Level Waste

# Critical Path Analysis




Note: From FY15– FY28

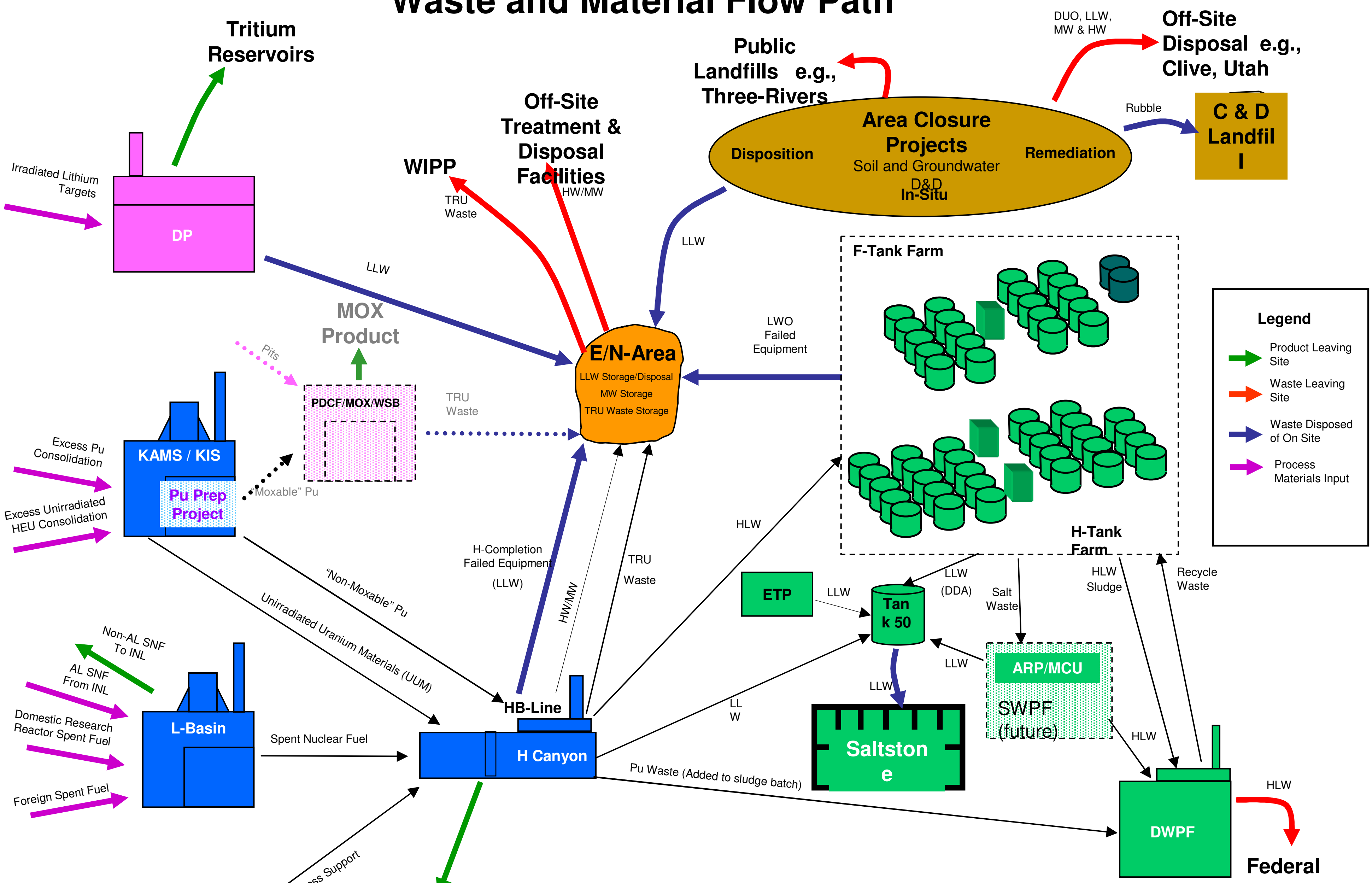
- (9) Sludge Batches fed to DWPF
- (3) DWPF Melter Change Outages
- Continued SWPF Operations except during DWPF Melter Change outages

# Liquid Waste Disposition
*(continued)*

H-Canyon; Salt Waste Processing Facility; and Defense Waste Processing Facility

- Unique Chain of Processes and Facilities
- Technology Development, Demonstration & Processing of Nuclear Materials and High Level Waste
- Valuable Resources and Treatment Facilities for the Nation
- H-Canyon Scheduled Shutdown 2019

# Savannah River Site
# Waste and Material Flow Path




This depiction of SRS activities shows only the general scope of the major facilities and missions.
It does not represent all processes or all materials flow.

# Summary

- SRS is complex and integrated onsite and throughout the DOE-complex;
- SRS has advanced technology available through onsite programs and the Savannah River National Laboratory;
- SRS Citizens Advisory Board effective and active public participation.
  - Recommendation and participation in the 3116 Waste Determination;
  - P Reactor Deactivation and Decommissioning Workshops to educate and provide input to the final end-state expectations;
  - F Tank Farm Performance Assessment comments; and
  - Annually input to the Budget Integrated Priority List.